



US006319297B1

(12) **United States Patent**
Fosnight(10) **Patent No.:** **US 6,319,297 B1**
(45) **Date of Patent:** ***Nov. 20, 2001**(54) **MODULAR SMIF POD BREATHER,
ADSORBENT, AND PURGE CARTRIDGES**(75) **Inventor:** William J. Fosnight, Austin, TX (US)(73) **Assignee:** Asyst Technologies, Inc., Fremont, CA (US)(*) **Notice:** This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** 09/049,354(22) **Filed:** Mar. 27, 1998(51) **Int. Cl.⁷** B01D 46/02; B65G 49/07(52) **U.S. Cl.** 55/318; 55/422; 55/482; 141/98; 414/291; 414/935; 414/937(58) **Field of Search** 55/318, 320, 328, 55/385.2, 401, 417, 419, 420, 422, 482; 141/98; 454/187; 414/291, 935, 937, 940(56) **References Cited****U.S. PATENT DOCUMENTS**

3,715,972 * 2/1973 Kelson et al. .
 3,975,995 * 8/1976 Shuler .
 4,062,781 * 12/1977 Strauss et al. .
 4,064,876 * 12/1977 Mulchi .
 4,129,145 * 12/1978 Wynn .
 4,461,205 * 7/1984 Shuler .
 4,532,970 * 8/1985 Tullis et al. .
 4,534,389 * 8/1985 Tullis .

4,666,479 * 5/1987 Shoji .
 4,724,874 * 2/1988 Parikh et al. .
 4,804,086 * 2/1989 Grohrock .
 5,058,491 * 10/1991 Wiemer et al. .
 5,114,572 * 5/1992 Hunter et al. .
 5,124,856 * 6/1992 Brown et al. .
 5,195,922 * 3/1993 Genco .
 5,297,990 * 3/1994 Renz et al. .
 5,346,518 * 9/1994 Baseman et al. .
 5,350,336 * 9/1994 Chen et al. .
 5,401,212 * 3/1995 Marvell et al. .
 5,431,599 * 7/1995 Genco .
 5,740,845 * 4/1998 Bonora et al. .
 5,879,458 * 3/1999 Roberson, Jr. et al. .
 5,988,233 * 11/1999 Fosnight .

* cited by examiner

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Modular cartridges which may be inserted into and removed from a well or receptacle on the bottom of a pod. The cartridges may be configured to include various types and combinations of valves, filters, and/or conditioning agents. A standalone cartridge replacement station may be provided for inserting and removing various cartridges from one or more of the receptacles on the bottom of a pod while wafers are seated within the pod. The standalone replacement unit may decouple an existing cartridge from the pod by rotating the cartridge from a locked to an unlocked position and then lowering the cartridge out of the pod. Thereafter, the replacement station may insert a new cartridge up into the appropriate receptacle and rotate the cartridge into a locked position in the pod.

17 Claims, 4 Drawing Sheets